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ABSTRACT

Sisters in Science, like many other programs aimed at fostering girls' interest and achievement in science, is designed to encourage more girls and women to prepare for the careers in math, science, and technology that will dominate the 21st century. One of the foci of Sisters in Science was on the role of teachers as decision-makers in promoting science literacy for all students. The overall goal was to familiarize teachers with reform initiatives in science education and to chart their progress as change agents of gender equity in the classroom. This paper reports results of year one and two on teachers' reflections and dialogue concerning their conception changes of teaching science and mathematics as they confront the issue of equitable practice. (Contains 59 references.) (Author/ASK)

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The Sisters in Science Program: Teaching the Art of Inqiury

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Running Head: SISTERS IN SCIENCE

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Abstact

Sisters in Science like many other programs aimed at fostering girls' interest and achievement in science, is designed to encourage more girls and women to prepare of the careers in math, science, and technology that will dominate the 21st century. One of the foci of Sisters in Science was on the role of teachers as decision-makers in promoting science literacy for all students. The overall goal was to familiarize teachers with reform initiatives in science education and to chart their progress as change agents of gender equity in the classroom. This paper reports results of year one and two on teachers' reflections and dialogue in concerning their conception changes of teaching science and mathematics as they confront the issue of equitable practice.

The Sisters in Science Program: Teaching the Art of Inquiry

INTRODUCTION

Shirley M. Malcolm, of the American Association for the Advancement of Science (AAAS), said in her keynote address at the American Association of University Women (AAUW) conference "Girls Succeeding in Science, Math, and Technology: Who Works and What Works,"

> The effort to equalize educational opportunities for girls is far from complete. She notes, Unlike some other nations, female students in the United States are legaliy guaranteed access to math and science courses. While our legal barriers to this education have been removed, there are often still barriers we face, these are 'barriers of the mind (Malcolm, 1997).

Many barriers still exist that prevent females from participating fully in science and mathematics throughout their lives. The organizational characteristics of science and mathematics play important roles in diminishing the achievement of females in these disciplines (AAUW, 1990, Bleier, 1984; Harding, 1986; Kahle & Meece, 1994; Keller, 1985, 1986). Other researchers agree that females perceptions about science and mathematics act as barriers to their expressing interest in science and mathematics in school (Baker & Leary, 1995; Kelly, 1985; Shroyer, Powell, & Backe, 1991). Also, the

perception that science and mathematics are masculine domains discourages females' from choosing science and mathematics related careers (Kelly, 1985).

Researchers have also found that while both boys and girls enjoy math and science in elementary school, girls' interest and confidence in their abilities to excel in those areas declines sharply during adolescence. This is particularly true among females from economically and educationally disadvantaged families who have limited access to educational resources and are often forced to cope with stressful life experiences (Mullis & Jenkins, 1988; Schibeci & Riley, 1986; Simpson & Oliver, 1990; Vetter & Babco, 1989; Ware & Lee, 1988). For example, the AAUW's survey "Shortchanging Girls, Shortchanging America" (1992) reported that the percentage of girls who said they enjoyed math dropped from 81% in elementary school to 61% in high school.

The report found that girls were frequently discouraged from exploring fields such as math, science, and technology; often unintentionally, by parents and teachers who steered them toward traditional female occupations. For example, the National Science Foundation reported that women made up about half of those working in the social sciences, but accounted for only 8 % of the nation's engineers. The AAUW's report also uncovered a strong link between females students' confidence in their mathematics and science abilities and their overall self-esteem.

The study noted, "As girls learn, they are not good at these subjects, their sense of self-worth and aspirations for themselves deteriorates." Similarly, the AAUW research found that both girls and boys "who like math and science have higher self-esteem, greater career aspirations, and are more likely to hold onto their dreams. Therefore, it is imperative to continue to instill positive accessible images about science

and mathematics in the minds of girls. Positive perceptions will in turn lead to greater female participation in science and mathematics with respect to academic endeavors and career aspirations.

Other research on gender inequity in science and mathematics focuses on the classroom environment. Studies have suggested that within classrooms, males and females receive a very different education (Jones & Wheatley, 1990). Girls have less exposure to science equipment than do boys. Girls also become less active in science classes as they progress through the grade levels (Klein, 1989).

Teachers' beliefs about students' abilities affect the manner in which female students operate in the classroom (Shepardson & Pizzini, 1992). Jones and Wheately (1990) looked at a variety of teacher behaviors during science instruction. They concluded that the manner in which the teacher praised students, responded to call outs, warned students, and questioned students differed by gender.

Female students also tend to differ from their male cohorts in their receptivity to and participation in science education. It has been noted that female students contribute less often to classroom discussion than their male classmates do. In fact, girls' conversations and the matters with which they concern themselves (i. e., interactional issues) are different from those of boys (Theberg, 1993). Finally, science education, is often competitive and individualistic, counteracting female learning styles that are more cooperative and interdependent in nature. Shakeshaft (1995) says that teachers have expectations that simply exclude girls and lead to lower participation and achievement by them.

Girls' perceptions of science also contribute to their inequity in achievement. Female students harbor stereotypical ideas about science and scientists. They often feel that science is a male dominated field (Hammrich, 1996). A meta-analysis (Weinburg, 1995) of the literature on gender difference in students' attitudes toward science as well as the correlation between students' attitudes about science and their achievements in science concluded that boys are more positive about science. Also, positive attitudes about science result in high achievement (Weinburgh, 1995).

Reformists believe that fostering a safe and nurturing environment, promoting problem-solving skills, creating collaborative experiences, using hands-on learning and allowing for open discussion about gender stereotypes are essential to encourage female students' success in the classroom (Allen, 1995; Mann, 1994).

Boland (1995) offers a set of strategies to promote gender equity in science and mathematics classrooms:

1. Set goals,
2. Accept more than one right answer,
3. Create equitable turn taking and use peer tutoring,
4. Link math with careers in science,
5. Display images of females and males in career roles,
6. Assign tasks equally,
7. Monitor groups for equity,
8. Vary teaching techniques,
9. Tap students learning styles,
10. Encourage problem solving,
11. Explore career options,
12. Utilize cooperative learning styles.

Other researchers address the issue of inequity in the classroom by recommending gender-sensitive instruction. In order to create a gender-sensitive learning environment,

it is necessary for educators to confront issues pertaining to girls and their education rather than merely equalizing the treatment of males and females (Martin, 1996). Martin (1996) offers several strategies to ensure a gender-sensitive classroom: (a) to utilize female-appropriate teaching, learning strategies and approaches to science; (b) to address the needs and experiences of girls; (c) to emphasize the importance of the social dynamic in the construction of the classroom environment; (d) to acknowledge the contributions and barriers of women in science; (e) to incorporate the impact of private and personal aspects of girls' lives on their educational experiences; and (f) is to remove the barriers that prevent girls from pursuing careers in science.

The female-friendly instructional strategies, recommended by Martin (1996), are essential to science learning for girls. Constructivism, an epistemological perspective of knowledge acquisition, serves as the foundation for many of the aforementioned suggestions regarding science and mathematics education reform. Constructivism is an approach to learning. Constructivists believe that children learn by doing. Learning involves changing pre-existing schema using new information acquired through varied experiences (Driver, 1995). In the constructivist framework, learning is both social and dialogical in nature. That is, as human beings interact with objects in their surroundings and with each other they construct mental models of their environment. The constant interaction of human and environment creates learning about the world (Driver, 1995).

Driver (1995) suggests that learners need to be given access to physical experiences as well as concepts and models of conventional science and mathematics. Science and mathematics instruction should consider the learner' individual conceptions, as well as their purposes and ideas, which can differ for each socially constructed group,

particularly, females. Finally, teachers need to present experiences that enable students to make mental connections to pre-existing events.

The "Science for All Americans" (American Association for the Advancement of Science, 1985) report extends Driver's list by suggesting that students should have opportunities to: express themselves in oral and written form, work in teams, solve problems, question, explore and discover concepts, use authentic tools, and learn about related professions and professional contributions to the field.

Declining interest in science and mathematics among females is additionally affected by experiences outside of school. Many females receive little or no reinforcement of their initial interest in science and mathematics from their families or social environment (AAUW, 1992). Research has reported that females and males have vastly different science and mathematics related experiences inside and outside the school (Kahle & Lakes, 1983; Linn, 1990; Rosser, 1990; Sjoberg & Imsen, 1988). Indirect and direct experiences that contribute to such difference include playing with scientific games and toys (Casserly, 1980; Hilton & Berglund, 1974), participating in science and mathematics activities at home (Kahle & Lakes, 1983; Mullis & Jenkins, 1988), taking science related field trips (Kahle & Lakes, 1983), parents' stereotypic behavioral expectations (Hoffman, 1977; Morgan, 1992), expectations for independence (Block, 1978; Hoffman, 1972), and parents' educational and vocational aspirations (Adelman, 1991; Brody & Fox, 1980).

Some females succeed academically in science despite the adverse circumstances (Bailey, 1996). Research has shown that when male and female high school seniors take the same amount and kind of science courses, females tend to outperform males

(Adelman, 1991; Kahle & Meece, 1994; Mullis and Jenkins, 1988). Research suggests that it is not that females cannot and do not have the ability to succeed in science, but rather that obstacles arise in recruiting and retaining females in the science workforce (Kahle & Meece, 1994).

It seems logical to expect that females' positive attitudes toward science are fostered by instructional methods, role models, and peer and social factors inside and outside of the school. Research has documented that these factors play a significant role in promoting success in science for females (Bleier, 1984; Harding, 1986; Kahle & Meece, 1994; Keller, 1985, 1986).

PROGRAM DESCRIPTION

Rationale

Temple University's College of Education and Center for Intergenerational Learning developed the *Sisters in Science* (SIS) program, a program sponsored by the National Science Foundation. SIS was conceived in the context of broadening the concept of teaching and learning for all students by uniting the active participation of parents and intergenerational role models with other factors that promote females' success in science. Inherent in the program goals is the notion of confronting the gender gap. SIS has chosen to do this in part by familiarizing teachers with reform initiatives in science education, focusing particularly on their role as change agents in the reforming of gender equity in the classroom.

Current science education reforms have focused on changing the curriculum, teaching and assessment in K-12 education to make it more equitable (National Research Council (NRC), 1996; Rutherford and Ahlgren, 1990). Specifically, the National Science

Education Standards emphasize the "development of environments that enable students to learn science that provide equitable opportunities for all students to learn science" (NRC, 1996 pp. 4.7). However, recent studies on equitable practices in the classroom tell a different story of the current educational climate (Eder, Evans & Parker, 1995; Orensteing, 1994; Pipher, 1994). While much of the science education reform literature acknowledges the central importance of "equity issues", the discussion centers around a "color-blind" point of view (Cochron-Smith, 1995; Ladson-Billings, 1995; Rodriques, 1997) rather than acknowledging differences in students. The Association for Educators of Teachers in Science indicate in their Professional Knowledge Standards that "unless prospective and practicing teachers can develop the knowledge, skills and beliefs called for in the reform documents little will change" (AETS, 1996). While the standards address the issue of equitable practice in the classroom they fail to capitalize on the importance of preparing teachers to issues of equity in the classroom. Methods for equitable practice must be embedded into the reform initiatives to ensure that all students are given the best possible chance for success.

Goals and Objectives

The research presented here is part of a larger research program that focused on increasing the science/mathematics attitudes and achievement of elementary school girls. Twenty-one teachers from seven different schools located in Philadelphia's inner city participated in the SIS program during year one (1997-1998) and 25 (17 new) teachers from six of the seven schools participated in year two (1998-1999) of the program. This paper reports on teachers' reflection and dialogue concerning their conception changes of

teaching science and mathematics as they confront the issue of equitable practice while participating in SIS in year one and two.

The two research questions were:

1. What are fourth and fifth grade teachers' conceptions of science/mathematics?

2. Are teachers' conceptions of science and mathematics teaching influenced as they confront the gender gap?

The SIS program offers a multilevel intervention centered on gender sensitive instruction and a constructivist learning model. To this end, cooperative exploratory hands-on science and mathematics education tasks along with self-reflection are employed to facilitate female friendly learning environment. Within this framework of constructivist learning, the SIS program was designed to provide instructional methods that demasculize and demystify science and mathematics, promote women role models and career information, and allow for active involvement. While girls are "doing" science and mathematics their self-confidence and self-perceptions of their ability to do science and mathematics is enhanced (Hammrich, 1997).

Program Components

One of the foci of SIS was on the role of teachers as decision makers in promoting scientific literacy for all students. The overall goal was to familiarize teachers with reform initiatives in science education and to chart their progress as change agents of gender equity in the classroom. The goal was addressed through a two week summer institute and year long academic curriculum meetings. The focus of the summer institute was for teachers to become familiar with and competent in the areas of equitable strategies in science and mathematics education, strategies for constructivist teaching,

strategies on integrating mathematics and science, and evaluation and assessment practices within the context of the SIS program. At the end of the two week summer institute teachers along with the science educators developed activities and guidelines to follow in the classroom in the current year. During the academic curriculum meetings teachers participated in focus group reflection and dialogue.

In their respective classrooms the role of the teachers was multifaceted. Not only did they teach integrated science/mathematics lessons that were constructivist in nature and embedded in gender equitable practice but once a week for 2 hours they supervised methods student's teaching in the in-school part of the program. The teachers observed the methods student's teaching and made observation notes as to the nature of their science/mathematics lesson as far as it was an integrated science/mathematics lesson that was constructivist and embedded in equitable practice.

PROGRAM EVALUATION

Method

Data was acquired from a variety of sources. Each of the two years, teachers responded to a demographic survey in the fall, and the Teacher Survey in both the fall and the spring. They participated in two focus group sessions in the fall and the spring of each year. The Classroom Teacher Observation Checklist was administered when each teacher was observed implementing lesson in the spring. Program implementation documentation was also used to supplement the aforementioned data.

A demographic survey was administered at the start of each school year to determine such information as age, race, years of education, years of teaching and type of

science training the teachers had. Each teacher was also asked to complete the Teacher Survey (Kahle & Rogg, 1997). The survey asked questions related to each of the following subscales: How I teach, What my students do, My school principal's involvement and Parental involvement. Teachers were asked to respond the frequency and the importance of each action/task. They used a likert scale for frequency was a 5 point scale ranging from almost never=1 to very often =5. The importance scale ranged from very unimportant=1 to very important=4.

The two 2- hour focus group sessions each year consisted of semi-structured open-ended questions directed to all teachers in attendance. The questions were designed to elucidate teachers' conceptions of science/mathematics as well as their thoughts about confronting the gender gap. The sessions occurred each year in December and May. Each session was videotaped and then transcribed. The interviewers, who were SIS staff, also took notes throughout each session.

Grounded theory was the method of analysis for the focus group data (Strauss, 1987). Focus group responses were videotaped, transcribed and coded in a data file using Ethnograph v4.0. Cases were examined as a whole. Extensive memoing and preliminary assertions were logged as focus group responses were conducted, transcribed, read, and re-read to find words, phrases and themes that reflected teachers conceptions concerning science/mathematics teaching and perceptions of confronting the gender gap. The focus group responses were analyzed using Patton's (1990) method for generating themes. Through the constant comparative method (Strauss, 1987) themes emerged and assertions developed. From these preliminary assertions were made and data was highlighted as to

possible warrants to support these assertions. Coding of data included both inter-rater and intra-rater reliability as well as several other provisions for trustworthiness.

Finally each teacher was observed implementing an integrated science and mathematics lesson in the spring of each school year. The observations were done at the teacher's convenience therefore they may not have represented a typical performance. The participants were again observed by SIS staff. Each observer filled out a predetermined observation checklist to note the occurrence of gender-sensitive, constructivist, and integrated science/mathematics instruction. The checklist was divided into the following subscales: Interactions, Conceptual Change-Pedagogy, Atmosphere, and Activity Type. The checklist was developed by SIS. The elements of the checklist were based on the critical dimensions of the program as set forth by the program's designers grounded on gender-equitable instruction.

Summary of Findings

Results gathered from the teacher survey, focus groups, demographic information, and teacher observation were used to judge the effectiveness of the intervention. Results showed that there has been a real change on the part of the teachers. Specifically, teachers reported that as a result of the cooperation between the schools and the university, they were teaching science and mathematics more often and more effectively; promoting connections with other subject areas, adopting more gender equitable constructivist approaches to teaching science and mathematics, and are changing their own attitudes about science and mathematics in a positive direction (see Table 1).

Insert Table 1 about here

By the time teachers enter the teaching field they have already developed a conception of teaching and learning (Perry, 1990). Quite often they have not reflected on their conception of science and delivery of equitable instruction and how their conceptions influences their conception of effective equitable science instruction. Preliminary training led us to believe that "equity" was not a much thought about topic with respect to science by all of our participants. As this study shows while teachers are accepting of examining and even embracing new conceptions of science teaching, many of the teachers still cling to their prior conception of science teaching when pressed with uncertainty in a teaching situation. This maybe due to lack of practical experience, reflection, or lack of specific knowledge in the area of gender equitable science and mathematics instruction.

In the classrooms observed, students were engaged in activities - which is expected since the observations were planned in consultation with teachers. The occurrences of gender-sensitive, constructivist, hands-on lessons were recorded for every observed lesson. The frequencies and percentages of each element of the checklist are listed in Table 2.

Insert Table 2 about here

It was found that most teachers (75% in year one and 60% in year two) were able to treat boys and girls equally with respect to engagement, interactions, encouragement, listening, and acknowledging. Boys and girls worked on similar tasks during the observations and most worked in a cooperative manner. Regarding conceptual change, most teachers engaged boys and girls in higher order thinking, asked open-ended questions and encouraged the boys and girls to initiate questions. Again, most teachers assessed prior knowledge, confronted and corrected misconceptions, and accepted more than one right answer. With respect to atmosphere most teachers did connect activities to real life experiences. Within the activity type subscale most teachers did implement hands-on lessons which used manipulatives and authentic tools. Teachers also facilitated learning by allowing for explorations and cooperation. However, the activities were seen as structured.

In addition to these, a common instructional feature observed in each classroom was the informal assessment (Haertel, 1991) practiced by the teachers while students were engaged in small group activities. It was also noticed that the girls interacted actively in the small groups and in answering and asking questions. One area that was observed to be weak in year one in promoting equity was in the classroom atmosphere. Most teachers did not have images of scientists on their wall nor did they make reference to science careers. In year two the classroom atmosphere appeared to be more gender equitable.

Teachers were asked to respond to a variety of questions concerning their own instructional practices, their students' activities and the involvement of their school principals and parents. Although teachers were asked to rate the frequency and

importance for each statement, importance didn't show a noticeable change. Therefore, frequency was looked at more closely.

Because of a small sample sizes for fall and spring the subscale mean scores were not found to be significant pre to post. There were however a number of individual action/task statements within several of the subscales that did show a mean score increase of .5 or more points from fall to spring (see Table 3).

Insert Table 3 about here

Research suggests that teachers' beliefs and reflections are important drivers of classroom actions and thus need to be considered in understanding changes in practice or any lack thereof (Peterson, Fennema, Carpenter & Loef, 1989; Schon, 1991). Beliefs act as the theories that guide actions and reflections and dialogue allow an examination of those actions in terms of one's beliefs and promote necessary modifications in either actions or beliefs.

Reflection and dialoguing on their practice in the classroom, teachers expressed that they are more aware of what they need to do in the classroom to promote equitable practice that is constructivist. All of the teachers expressed that they were not always conscious of practices that exclude girls in the learning process but as they reflected upon their teaching they became more conscious of their practice and were able to adjust their teaching to include <u>all</u> students, not just the girls, in the learning process. The teachers said that being apart of the programs design and having open dialogue with one another

and the SIS staff helped them in their reflection and practice. They felt less isolated and more involved in the reform process in their classroom.

Many of the teachers say they enjoy teaching science more. A number of teachers expressed that they have developed new ways of teaching science and mathematics throughout the year. All of the teachers expressed the belief that involving all students in the learning process was crucial for effective teaching. The teachers noticed that their students became more excited about learning when they were actively engaged in activities. They also noted that the girls seemed to blossom in the classroom when they were working on projects or in groups.

Teachers agree that they have become more reflective of their teaching experience. However, the teachers did expressed the concern that when they are confronted with teaching a science topic that is new and unfamiliar they tended to revert back to a more traditional teaching approach. They also noticed that when this occurred the girls become less participatory in the activities. Specifically related to equitable practice, teachers revealed that not all their lessons make a connection to gender sensitivity but they are still learning and trying new approaches. This was a concern expressed by all the teachers. However, they said that by just being conscious of this occurrence was helping them change their teaching practice. They tend to be able to be mindful of what is occurring and try to change their practice.

Implications

The call for systemic reform presents a great challenge in facilitating teachers' conceptions of science/mathematics teaching and practices of confronting the gender gap. In order for teachers to model practices of teaching that promote gender equity in science

and mathematics, they must participate in reflective practice. Teachers must be actively involved in the process of reform because they are the change agents of reform in the classrooms. Reforming science/mathematics teaching that confront the gender gap requires reforming teachers conceptions first. Unless teachers reflect upon and practice reformed teaching strategies that promote gender equity, it is unrealistic to expect change.

As schools strive to embed equitable practice into their curriculum they must actively involve teachers in the process of reform. The implementation of new teaching approaches that involve equity has to have a reciprocal relationship with teachers conceptions and actions, because teachers are the agents of reform in the classrooms. How reform in the practice of promoting equity in science education should be implemented into a classroom must be informed by teachers conceptions of science teaching and equitable practice. Likewise, teachers need to be informed by the research on equitable practice.

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Table 1. Select Comments from Focus Group Sessions

Question segments	Fall 1997 N=21	Spring 1998 N=25
Were you able to teach more science outside of the practicum time slot?	• No additional science taught • Two teacher had additional science prep periods	Eleven teachers stated they taught additional science.
Has your teaching changed as a result of practicum? How has it changed?	• More of an awareness of what needs to be done to create these types of lessons. Self reflection increased • Have acquired new strategies, activities are more hands-on • Girls are more involved • Students enjoy the TU-school connection	• More hands-on activities • More coordination with science teachers in the building • Began to model TU's student's methods of delivery and lesson plans. • Students engaged in more of the scientific process and did more research.
Has your teaching become more gender-sensitive/hand-on due to SIS? How has it changed?	• More hand-on activities • Tried to utilize different learning styles beyond the gender issue.	• Yes it was more gender-sensitive • Became more conscious of calling on students • More equitable • Girls participated more • Students were more interested
Are you more comfortable with hands-on/minds-on instruction?	• Yes	Yes

Table 2. Classroom Teacher Observation Checklist Spring 1998
N=16

Item	Frequency	Percentage
Interactions		
1. Teacher equally engages boys and girls in dialogue.	16	100%
2. Teacher interacts equally with boys and girls.	16	100%
3. Teacher equally encourages boys and girls to accept the same roles in the classroom	15	94%
4. Teacher listens to boys and girls equally.	16	100%
5. Teacher equally acknowledges boys and girls' responses/explanations.	16	100%
6. Students work in a cooperative manner.	12	75%
7. Boys and girls do similar tasks in the classroom.	16	100%
Average	15.3	96%
Conceptual Change-Pedagogy		
1. Teacher equally engages boys and girls in higher order thinking.	15	94%
2. Teacher assesses prior knowledge.	15	94%
3. Teacher confronts misconceptions.	14	88%
4. Teacher corrects misconceptions.	14	88%
5. Teacher accepts more than one right answer.	15	94%
6. Teacher equally asks open-ended questions of boys and girls.	15	94%
7. Teacher equally encourages boys and girls to initiate questioning.	5	31%
Average	13.3	83%
Atmosphere		
1. Diverse images of scientist/science careers are present (gender, race/ethnicity, age).	2	13%
2. Teacher makes references to science and careers in science.	5	31%
3. Teacher connects classroom activities to real life experiences for students.	13	81%
Average	6.7	42%
Activity Type		
1. Activities are hands-on.	12	75%
2. All students use authentic tools and manipulatives to solve problems.	12	75%
3. Activities are cooperative in nature.	12	75%
4. Activities integrate math and science skills.	9	56%
5. Teacher accepts a variety of student performance outcomes.	11	36%
6. Teacher allows for student exploration.	13	81%
7. Teacher allows for student lead instruction.	4	25%
8. Activities are structured.	15	94%
Average	11	36%

Table 3. Individual action/task statements with greater than .5 point increase in mean score from fall to spring.

Subscale	Statement	Fall to Spring (increase)
How I teach	Arrange seating to facilitate students discussion	3.6 to 4.1 (.6)
	Provide time for m students to discuss subject specific ideas among themselves	3.2 to 4.4 (1.2)
	Discuss experiments from the history of mathematics/science	2.2 to 2.9 (.7)
What my students do	Use data to justify responses to questions	2.9 to 4.0 (1.1)
	Debate with one another about the interpretation of data	2.6 to 3.4 (.8)
	Repeat experiments to confirm results	2.3 to 3.5 (1.2)
	Use educational technology in the classroom	2.8 to 3.6 (.8)